



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

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HELENA, MONTANA 59626**

Ref: 8MO

March 13, 2012

Richard Opper  
Director  
Montana Department of Environmental Quality  
P.O. Box 200901  
Helena, Montana 59620-0901

Re: EPA Comments on the draft Preliminary Design Report for Reach A Phase 1, Clark Fork Site

Dear Mr. Opper:

This letter addresses comments on the draft Preliminary Design Plan (PDP) for Reach A Phase 1 of the Clark Fork Site, prepared by the State Department of Environmental Quality (DEQ). The draft PDP outlines an ambitious and environmentally significant cleanup plan for the Reach A Phase 1 area. The EPA appreciates the amount of work and effort that has gone into the development of this draft PDP. The EPA looks forward to cooperatively completing cleanup design plans for this site in a timely manner, so that this project can be implemented successfully by the State of Montana.

The EPA received the draft PDP on December 16, 2011. We then received technical memoranda, attachments, and review memoranda by State contractors in late December and early January, 2012. The EPA was given a briefing by the State technical and legal team on the draft PDP on January 31, 2012. We have been working diligently on our comments throughout this time frame, and very much want to cooperate with DEQ's desire to begin preliminary work on this project in 2012. In general, EPA is supportive of the design approach.

The EPA's comments on the draft PDP are submitted pursuant to the Clark Fork Site and Remaining State of Montana Clark Fork Basin Natural Resource Damage Claims Consent Decree (Clark Fork Site CD), paragraphs 38 and 44.

The Clark Fork Site CD, in Paragraph 44, describes five categories of comments on documents the EPA may comment upon: technical adequacy, consistency with CERCLA, consistency with the National Contingency Plan (NCP), consistency with the Record of Decision, consistency with the Superfund Memorandum of Agreement for the Clark Fork Site, or consistency with the Clark Fork Site CD. The substantive comments below focus on technical adequacy and issues regarding applicable or relevant and appropriate requirements (ARARs) – the Clark Fork Site CD requires work to be in compliance with ARARs as does CERCLA and the NCP. We believe these comments can be resolved readily through continued consultation between our agencies, the US Fish and Wildlife Service, and other parties. We are committed to working through these comments at the staff and management level in a timely and cooperative manner.



Subparagraph 44.a. of the Clark Fork Site Consent Decree states that DEQ shall incorporate or attempt to resolve all comments submitted by the EPA on any plan or report submitted to the EPA for review and comment before proceeding to the next phase of remedial design. As noted above, EPA is committed to working through all of these comments expeditiously with you, but we are concerned that recent instructions to DEQ contractors for completing the Reach A Phase 1 design do not build in time for this step and to occur as required. We are available for discussion and resolution of these comments as soon as possible to assist DEQ in moving the project forward.

Our understanding is that a final PDP or similar document will be produced that will incorporate or address these comments (after discussion with EPA) as well as the review comments from DEQ's consultants. It is also our understanding that the design review team, which involves members of the public and other agencies, will be given the opportunity to review and comment on the design plans as well.

The EPA will address these comments constructively and otherwise coordinate with remedial action implementation at this site with DEQ. We have mutually agreed to have this particular design go forward in a cooperative and timely manner with a funding arrangement that is 80% remedial funding and 20% State restoration funding for implementation of the final Reach A Phase 1 design.

Further development and implementation of this design, along with further discussions about the ROD, should lead to a mutually shared view of the Clark Fork Site remedy between the two agencies. This letter does not contain our detailed comments regarding consistency with the ROD, SMOA, and Consent Decree because of the understandings we have reached during separate discussions regarding these issues. We look forward to the continuing discussion with you on these topics.

### General Comments

Design requirements should contain a complete description of how ARARs, including pertinent citations, and a description of how these standards will be translated into engineering parameters. Key ARARs – such as stormwater control and construction Best Management Practices ARARs – should be listed and a description of how this plan complies with those ARARs should be given.

One very important ARAR – the federal Endangered Species Act – needs careful consideration for this project. The Biological Opinion for the Clark Fork Site remediation lists substantive provisions that must be followed for the protection of bull trout and other threatened or endangered species, and this will require direct interaction with the US Fish and Wildlife Service (US FWS) and its counterparts within the State Fish, Wildlife and Parks Department. The EPA believes it is important for the DEQ to consider these issues carefully and describe compliance efforts in the next version of the plan. In general, we suggest that the PDP discuss this ARAR in greater detail.

Upon implementation of this plan, the current landscape within the floodplain will be significantly modified with increased wetlands, open water, emergent wetlands, and secondary channels. Land use, typically open space and wildlife habitat, will change. The EPA has concerns with transitioning from the inset floodplain channel plan back into the existing downstream channel pattern at the Phase 1 area northern boundary because the low pH (< 6.5) level contamination is not at depth in Phase 2 in the southern areas to support lowering the floodplain through remediation. Also, there is private property in the southern boundary on the east side of Phase 2 and this property owner has not been consulted about

the family's intended future land use. Transitioning from the inset floodplain channel plan back into the existing downstream channel pattern was also raised as a potential geomorphic stability issue by DEQ's contractors in the draft preliminary design plan (draft PDP) and needs more attention during the remaining design process.

Furthermore, while the proposed bank stabilization treatments are technically sound, the use of a small number of treatments to treat an extensive project reach length with heterogeneity in local slopes, bank heights, soil types, hydric characteristics, and near bank shear stresses, as proposed in the draft PDP, should be reconsidered.. This point was echoed in the review by River Design Group (RDG) which was completed for the State. Discontinuous deposits of clay as well as lenses of less resistant, non-cohesive materials will also make this difficult. We recommend that all reinforcement materials be chosen with specific correlation to expected local shear stresses, corrected for site geomorphology (e.g., radius of curvature) and other geotechnical factors. Given the physical scale of this project, we note a larger suite of treatment options can lower per-foot costs by using local or less expensive materials in passive low-energy or depositional areas. An example is the extensive linear use of coir in the proposed design. While robust, coir logs and their installation are expensive, and long extents can propagate local failure. Where coir is used, attention should be given to RDG's points regarding anchoring, discontinuous installation, and cut-off sills.

The Reach 3 cutoff in Phase 2 has reduced the length of the Clark Fork River channel from approximately 1,253 feet through the meander to approximately 265 feet through the cutoff, reflecting a reduction in total channel length of approximately 988 feet. At an average reach slope of 0.001, this would cause a discontinuity of 0.98 feet. This suggests that the grade discontinuity generated by the cutoff has not substantially migrated upstream. Bank erosion and channel lengthening have absorbed some of the original steepened grade through the cutoff. If the continued lengthening of this cutoff channel is arrested by remedial action in Phase 2, it is important to consider the future of the grade discontinuity, in that profile data indicate that there is some potential for downcutting of up to a foot upstream of River Mile 2.6.

Excavating below the water table, as proposed in the draft PDP in an alluvial aquifer presents a number of problems (for example, dewatering large volumes of water, discharge /treatment issues). Very limited groundwater data has been collected in Reach A and indicates that the groundwater underlying the Governor's Demonstration Project, located within Reach A Phase 1, met ambient water quality standards in 2010 (Gordon et al, 2010). However, the groundwater data collected in the Governor's Demonstration Project was only collected in the northern portion of Phase 1 and on the eastern side of the river. Groundwater downstream of Phase 1 at the Clark Fork Coalition Ranch had acute ambient water quality exceedances for cadmium, copper and zinc in 2010. This distinction is important because the southern portion of Phase 1 has high concentrations of zinc and copper at depth and this area was not treated as part of the Governor's Demonstration Project so the EPA assumes any groundwater that would be dewatered could potentially exceed ambient water quality ARAR standards and would need to be treated to meet these standards.

If point sources of water contamination from identifiable metals contamination are retained or created by remedial activity, applicable Clean Water Act standards would apply to those discharges. Limited groundwater has been collected in this area to demonstrate compliance with the applicable surface water quality standards. The draft PDP indicates that water from dewatering activities will be pumped into the Clark Fork River. A monitoring plan needs to be developed as part of PDP and final remedial design

plans that contains provisions to monitor discharge to the river and to treat any groundwater that exceeds ambient water quality standards if DEQ determines that excavation at depth is still necessary.

The PDP discusses a 6-inch over-excavation criteria. Without further information and justification, the EPA believes it is uncertain whether 6 inches of over excavation will remove all of the contaminated material. Post-remedial sampling of newly exposed material and determination of contaminant concentration prior to backfilling is not specified in this draft PDP and should be added. The EPA recommends post-removal confirmation sampling be discussed further in order to ensure that a sufficient depth of soils have been removed prior to starting backfill operations. At a minimum, visual examination for tailings material, as well as discrete soil sampling at predetermined locations and depth intervals, are initially recommended. Further details can be discussed as remedial design proceeds but the issue is important and needs to be addressed and agreed to by the agencies.

While attention has been given to the various floodplain features to create heterogeneity, these features are largely unconnected to the active channel. This is a potential concern, particularly given the selection of the 2 year flow for channel design. While the stage difference between this flow and possible lower return interval flows may not be significant in terms of physical stability, it can significantly alter ecological processes and values. Furthermore, as RDG's review points out, lowered floodplain elevations often lead to more dependable passive and active revegetation, which is particularly relevant given this area's vulnerability to desiccation in winter, when irrigation is not possible. Lowered floodplain elevations lead to some risk of undesirable avulsions or other adjustments.

The final PDP should describe conceptual Operation and Maintenance (O&M) requirements so that the EPA understands DEQ's future role and plans upon completion of site remediation at Reach A Phase 1. A more formal O&M plan can be developed later according to the Clark Fork Site CD. Similarly, the Clark Fork Site CD and the ROD requires the development of land owner best management practice plans. Conceptual ideas for these plans should also be discussed in the PDP, although specific plans are not required at this time and can be developed later.

The EPA recommends development of a Monitoring and Adaptive Management Plan as part of the PDP. Monitoring during construction, construction BMPs, and post-construction environmental monitoring will be required. Weed control for streambank stabilization and removal areas is also an important component of the ROD, and should be addressed.

The EPA recommends development of a plan for minimizing negative effects on both recreational users and the surrounding community during construction and O&M phases as part of the design specifications. Discussion of this should be included in the PDP.

In response to a 1989 fish kill, clean fill was brought in to construct earthen berms to reduce the amount of runoff from exposed tailings. The PDP should consider and discuss to the possibility of salvaging clean berm material for use as backfill rather than disposing of it offsite?

Review of sheets C2 and C3, Existing Conditions, indicates that over 10% of the test pits could not safely or practically be opened and sampled and the depth of contamination was given a greater than sign. The PDP should describe how the final excavation depth was determined for these areas?

The EPA believes it is important for DEQ to fully explore and document the ramifications of its design to lower the floodplain. Issues that should be examined in more detail in the PDP include bank stability,

movement of sediments, and deposition during periodic flooding, land use, and future land management, among others. These issues present some site risks, especially during the initial growing period of the stabilizing vegetation. For example, if sediment loads to the reach increase due to the progressive delivery of bedload through the Mill/Willow bypass, sediment storage may ensue, and erosion locations and severities may change. Similarly, if a large flood event were to occur in the reach, banks that currently show no evidence of retreat may destabilize.

There are sections of the draft PDP that need further clarification and amplification. The PDP states that the system is erosive because of contaminants, but also documenting low width/depth ratios and little plan form change – these conditions and theories need to be explained in a more consistent manner. Other issues such as questionable use of plan form/avulsion risk metrics from a sandbed reference system (and as a result the berming shown in Figure 3.1 and described in Section 3.2.2.3 may not be necessary or appropriately designed), more detailed planning for vernal features, discussion of clear utilization of LIDAR data up to its potential, and more information concerning ingress/egress and haul path design to minimize compaction or avulsion risk should be addressed in the final PDP.

In general terms and with the points above and below noted, this plan manifests strengths in describing goals and standards, hydrologic and geomorphic contexts, and both active and passive revegetation. EPA suggests further detail should be included regarding ecological metrics and goals, clear logic paths, and site specificity in selection and application of restoration techniques, as well as articulation of a strong monitoring and adaptive management plan. This document may not have been meant to address biotic response issues, but since it addresses an integrated program at least some reference to these issues in early planning is desirable. Since this is an interagency effort, more specific hypotheses, integration pathways, and expected response metrics would aid coordination, implementation, and communication between agencies and between agencies and the public. In addition, these refinements, as well as acknowledgment of various risk factors and sources of uncertainty, would help in project implementation, adaptive management, and public expectations and perceptions.

### Specific Comments

#### Section 1-1

While the combination of high metals and high sulfate concentrations suggests that many of Contaminants of Concern (CoCs) are present in the shallow soil as water-soluble sulfate salts, there is no data presented in previous investigations to support the statement that heavy metals are leaching into groundwater and ultimately into the surface water in this phase of the project. As noted the limited ground water data available indicates that the existing ground water may meet ground water standards currently. Please explain or modify this statement.

Multiple contaminant transport pathways are described, but no linkages are made between selected cleanup techniques and pathways. Additional explanation should be added.

#### Section 1.2

No supporting information is provided for the statement in the PDP that “tailings depths on the specific property may be greater than those at downstream reaches where investigations are currently being undertaken.”

DEQ should provide its basis for how contamination in Reach A is “exacerbated by depth of tailings,” given the next statement that “these sources directly impact plant and animal life through uptake and ingestion, and also impact humans who come in contact with the soils.” Depth of tailings would tend to mitigate uptake, ingestion, and direct contact. As indicated above, DEQ has provided no basis to support the statement that “metals are leached directly from the tailings into groundwater and surface water.”

## Section 2

DEQ provided no information on its classification system performed by Geum, its contractor, in 2010. DEQ should provide detailed data on the studies performed by Geum on its behalf.

### Section 2.1

Though DEQ’s Bank Evaluation Hazard Index (BEHI) scores were high enough to raise concerns, the geomorphic investigation also documented low migration rates, high plan form stability, and low width/depth ratios. As this part of the draft PDP noted, poor vegetation cover rather than actual instability or morphologic form shifts seems to be the issue. In areas of low contamination and good vegetation cover, this characteristic should be noted and other means identified to reconnect floodplains and stimulate passive vegetation. In-channel constructed riffles are an example of this phenomenon.

The geomorphic study of the first 3.5 miles identified a gradient of 0.15 percent while the Governor’s Demonstration Monitoring of the first 4.3 miles identified a gradient of 2.7%. Identification of local slope changes is an important factor in site treatment modality. It is assumed that additional transects were surveyed for the design allowing for greater accuracy but the final PDP should confirm that there is not a significant drop in elevation in Phase 3.

### Section 2.7

Little discussion is in this section regarding the use of LIDAR data for anything other than topographic mapping. The PDP should indicate whether it will be used for physical monitoring and also if it shows the kind of dynamism and complex lateral and vertical flow paths that one would expect from the described historic conditions of significant beaver populations. The PDP should also describe whether there any evident remnant features that may have induced disproportionate tailings deposition or that could inform assessment of interflow pathways.

### Section 3.1

The EPA questions the statements in the draft PDP that 95% of the total area of tailings is saturated or potentially saturated during high water periods. In about 40% of the test pits that were completed at a distance greater than 125 feet from the river, no groundwater was encountered and the majority of the test pits where groundwater was encountered were located on the west side where the ground is saturated year round. A review of the test pit logs that were dry indicate that the soils were fairly dry for the first 24 inches which does not correlate to being saturated during high water periods. In addition, the Sampling and Analysis Plan for this area did not have a Standard Operating Procedure developed for determining moisture at depth.

The only groundwater collected in Phase 1 was collected in close proximity to the river channel and was only collected in one location at the northern boundary of Phase 1 on the east side of the river (Gordon

et al 2010). Therefore, the groundwater data collected in support of this PDP is not a true representation of groundwater conditions in the Phase 1 remedial study area and may not be applicable to the whole study area.

In short, better and more supported documentation and description of the saturated or potentially saturated area for Phase 1 should be provided.

Lime is only slightly soluble in water. Therefore, the addition of lime to acidic soils /mine waste can be effective even with some water influence on the soils/waste. If lime is amended into surficial soil / mine waste above the water table, there should be no significant dissolution of the lime due to rising water table. There was an opportunity to collect data in support of the statements concerning treated area in the draft PDP and to properly evaluate the results of Governor's Demonstration Project because lime was amended to the soil as part of the Governor's Demonstration Project 20 years ago. However, most of the samples taken in the lime amended areas were screened using XRF for metals, and were not submitted to a laboratory for this type of analysis. Therefore, the statement that the lime will not remain in place under saturated conditions needs specific site data to support it, or the statement should be deleted. Lime is only slightly soluble in water, so the basis for excavating contamination that is saturated for only a portion of the year as necessary in lieu of the in-situ treatment remedial action described in the ROD may not reflect what has actually occurred.

#### Section 3.1.1

Since the ROD had multiple human health standards for arsenic, please specify which arsenic standard is being used and why this standard supports the anticipated future land use for Phase 1.

DEQ has developed a proposed removal criteria of 800 mg/kg, where removal is indicated by site conditions, for the sum of the concentrations of copper, zinc, lead, cadmium & arsenic. This value came from a technical memorandum developed by the EPA's contractor CH2MHill in 2008 that was intended to provide guidance on the removal of soils greater than 2 feet in thickness in areas identified by the Riparian Evaluation System (RiPES) as exposed tailings (slickens) or impacted soils (CH2MHill, 2008). The memorandum also provides guidance to address associated questions relative to the determination of the limit or depth of contamination in areas that were scored as slickens or impacted. It was never intended to be used as a Basis for Action or action level for broad based removals. The EPA considers the use of the 800 mg/kg for broad-based removal actions, such as is proposed in the draft PDP, to be relevant to restoration (return of conditions to baseline, pre-contamination), but not as a remedial action cleanup level.

The technical memorandum at issue also recommended that, in addition to the concentrations of the contaminants of concern, a pH value below 6.5 was also an important factor in determining areas to excavate (CH2MHill, 2008). DEQ only looked at the sum total of the CoCs and did not consider pH values in determining removal areas in the draft PDP. A review of all samples sent to the lab for analysis indicate that about 15% of the samples analyzed for pH had values below 6.5.

### Section 3.2.2, #1, #3, Figure 3-1,

The need for the raised area described here is questionable given the system's attenuated peak flow regime. The design is based on studies by Slingerman and Smith, and those authors derived their rule of thumb on sand-bed streams, which may not be wholly relevant for the upper Clark Fork. Please reconsider this aspect of the design. If it is judged to be necessary, it should be inset from current bank lines. Lowering the inner meander elevations may be only temporarily effective as the project moves downstream and the system's sediment supply renews itself.

### Section 3.2.3, #5

Should vernal pools be included for amphibian recruitment?

### Section 4.1

The PDP states that "removal has been selected as the appropriate remedy for Phase 1." The remedy for the Clark Fork River Operable Unit was selected in the Record of Decision.

Please provide the rationale for assuming a 6-inch over-excavation depth. As noted, DEQ will need to include the development of plans for confirmation sampling at the base of excavations, including the frequency representative area(s) from which samples will be collected, and whether DEQ will use composite samples or single point samples to confirm the limits of its excavation.

#### Section 4.1.1

Please note that "the cutoff between contaminated and clean material" was not recommended by the EPA "for removal of tailings deeper than 2-feet deep."

### Section 4.6

As noted above, the EPA questions the need to excavate below the ground water level. If this aspect of the design is included, the design criteria, another step needs to be included that discusses sampling of the groundwater prior to discharge to ensure it is in compliance with ambient water quality standards and a contingency plan developed for treating this water prior to discharge if there is an exceedance.

#### Section 4.6.1

Dewatering needs to address in detail design and site reclamation to minimize avulsion risk, techniques to dewater in climatic or flow anomalies, and cut-off standards.

#### Section 4.6.3

Some language regarding ingress-egress design, equipment specs, and post-project road removal to minimize compaction, removal costs, and potential for avulsion is needed.

#### Section 4.8

Rather than refer the reader to prior unapproved documents pertaining to Construction Best Management Practices, include these as an appendix to the PDP.

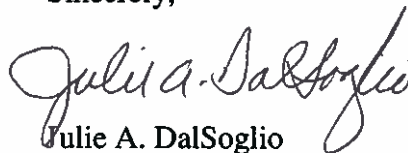
Contamination at depth also exists between stations 97+00 and 104+00. Some discussion needs to be included on how water will be managed in this area.

#### Peer reviews by RDG and Pioneer

Both reviews raise excellent points and are well executed. DEQ is commended for obtaining these reviews. The points raised about incipient motion calculation techniques and toe material sizing are central issues for consideration and should be addressed carefully by DEQ. The remediation plan strikes an admirable balance between short-term stability and long-term deformability, but a small, specified safety factor and guidelines for scour depth and flanking protection are desirable to maximize implementation efficiency and to minimize the potential for equipment operator judgment errors. Similarly, guidelines and standards for lenses of clay and sand encountered during implementation are needed.

As noted above, the EPA is committed to working with DEQ to address these issues in a timely and cooperative manner such that the production of a final PDP can proceed quickly. The EPA recognizes the environmental benefits of the proposed project and looks forward to working cooperatively with DEQ to implement a successful project.

Sincerely,



Julie A. DalSoglio  
Director  
Montana Office

cc: Roger Hoogerheide, EPA  
Henry Elsen, EPA  
Joe Vranka, EPA  
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